

1 **Amendment to the Specification**

2 **In the Specification:**

3 Please amend the specification as follows:

4 On Page 7, before the paragraph and heading titled Brief Description of the Drawing Figures
5 beginning at line 29, please add the following new paragraphs (this addition represents disclosure
6 being imported from the parent application in which priority is claimed, as noted above, and does not
7 represent new matter).

8 Another aspect of the present invention is a microreactor for use in the modular
9 reaction system, for reacting one chemical with at least one other chemical, for
10 the purpose of forming a chemical product. The reactor includes a plurality of
11 simple plates, each simple plate having at least one opening formed therein, the
12 simple plates being stacked together to form a plurality of layers and arranged
13 so that at least one opening in each simple plate overlaps at least one other
opening in an adjacent simple plate, thereby forming at least one pathway
between at least some of the layers.

14 Preferably, openings within different layers align so as to form at least one
15 inlet port and at least one outlet port, for the receipt and discharge of
16 chemicals, and to form at least one pathway for conveying chemicals to be
17 processed. At least one pathway is formed that is in fluid connection with the
18 inlet and outlet ports, and each simple plate has at least one opening formed in
it.

19 A material from which the simple plates are fabricated is selected for
20 compatibility with the chemical process. In one embodiment, the simple plates
21 are formed from a material selected from the group consisting of crystalline
22 wafers, ceramics, glasses, polymers, composite materials, and metals.
23 Preferably, if formed from a metal, stainless steel is used. The material of the
crystalline wafer is selected from the group consisting of silicon and
germanium.

24 It is also preferable that the reactor accommodate a plurality of operations,
25 including temperature control, control of chemical residence time, chemical
26 mixing, and chemical reacting. Temperature control is achieved using a
27 combination of one or more temperature sensors and one or more heat
28 exchangers. Preferably, chemical mixing is carried out by employing
pathways sized so that a reactant achieves a stacked laminar flow with respect
to at least one other reactant.

29 In a reactor adapted for processing at least two reactants to form a desired
30 chemical product, an inlet opening for each of the reactants and an outlet
opening for the chemical product is provided in at least one of two outer

1 simple plates. An intermediate simple plate is included for mixing the
2 reactants and has at least one opening in fluid communication with each inlet
3 opening and the outlet opening.

4 Generally, at least one heat transfer fluid inlet port is included in at least one of
5 the outer simple plates, so that at least one heat transfer fluid can be introduced
6 into the chemical reactor. Each heat exchanger is defined by an opening in a
7 different intermediate simple plate. The opening is in fluid communication
8 with the heat transfer fluid inlet and outlet ports and is disposed between
9 adjacent simple plates.

10 Preferably, each heat exchanger is used to modify the temperature of at least
11 one of the reactants and/or the chemical product. The heat exchangers can be
12 used to modify a temperature of one of two reactants such that they are at
13 different temperatures.

14 The thickness of the outer simple plates is about 3 millimeters, and that of the
15 plurality of intermediate simple plates is at least about 0.2 millimeters, but not
16 more than about 0.6 millimeters.

17 Preferably, the thickness of the intermediate simple plates that are adjacent to a
18 heat exchanger is about 0.3 millimeters. When a series of openings in the
19 simple plates of the chemical reactor defines a fluid path for a heat transfer
20 fluid that flows through more than one heat exchanger, the flow rate and fluid
21 pressure of the heat transfer fluid within each such heat exchanger are
22 substantially equivalent.